We Claim:

1. A method of treating a disease related to glycogen metabolism and/or protein synthesis comprising administering a composition of RAC-PK, its analogues, isoforms, inhibitors, activators and/or the functional equivalents thereof to a mammal in need thereof.

2. The method of Claim 1 for the treatment of disease states where glycogen metabolism and/or protein synthesis exhibits abnormality.

3. The method of Claim 1, wherein the disease related to glycogen metabolism is diabetes.

4. The method of Claim 1, wherein the disease related to protein synthesis is cancer.

5. The method of Claim 4, wherein the cancer is breast, pancreatic or ovarian cancer.

6. The method of Claim 1, wherein RAC-PK is RAC-PKα, β or γ, an analogue, isoform, inhibitor, activator or a functional equivalent thereof.

7. The method of Claim 6, wherein RAC-PK, its analogue, isoform or functional equivalent is modified at one or both of amino acids 308 and 473 by phosphorylation and/or mutation.

8. A pharmaceutical composition comprising RAC-PK, its analogues, isoforms, inhibitors, activators and/or the functional equivalents thereof.

9. A peptide comprising an amino acid sequence Arg-Xaa-Arg-Yaa-Zaa-Ser/Thr-Hyd, where Xaa is any amino acid, Yaa and Zaa are any amino acid, and Hyd is a large hydrophobic residue, or a functional equivalent of such a peptide.

10. The peptide of Claim 9, wherein Hyd is Phe or Leu, or a functional equivalent thereof.

11. A peptide as claimed in Claim 9, wherein Yaa or Zaa or both are an amino acid other than glycine.

12. A peptide as claimed in Claim 9, having the amino acid sequence as set forth in SEQ ID NO: 5, or a functional equivalent thereof.

13. A method of identifying agents able to influence the activity of GSK3, said method comprising:

(a) exposing a test substance to a substrate of GSK3; and

(b) detecting whether said substrate has been phosphorylated.

14. A method of identifying agents which influence the activity of RAC-PK, comprising:

(a) exposing a test substance to a sample containing RAC-PK, to form a mixture; and

(b) exposing said mixture to the peptide of Claim 9.

15. The method of Claim 14, comprising the additional step of detecting whether said peptide has been phosphorylated.

16. The method of Claim 15, wherein the phosphorylation state(s) of one or both of amino acids 308 and 473 on RAC-PK is determined.

17. The method of Claim 13, wherein the test substance is an analogue, isoform, inhibitor or activator of RAC-PK.

18 The method of Claim 13, wherein steps (a) or (b), or both, are carried out in the presence of divalent cations and ATP.

19. An agent capable of influencing the activity of RAC-PK, its isoforms, analogues and/or functional equivalents, by modifying amino acids 308 and/or 473 by phosphorylation or mutation.

20. A method of determining the ability of a substance to affect the activity or activation of RAC-PK, the method comprising exposing the substance to RAC-PK and phosphatidyl inositol polyphosphate and determining the interaction between RAC-PK and the phosphatidyl inositol polyphosphate.

21. A method of determining the ability of a substance to combat diabetes, cancer or any disorder which involves irregularity of protein synthesis or glycogen metabolism, the method comprising exposing the substance to RAC-PK and phosphatidyl inositol polyphosphate and determining the interaction between RAC-PK and the phosphatidyl inositol polyphosphate.

22. The method of Claim 20, wherein the interaction between RAC-PK and the phosphatidyl inositol polyphosphate is measured by assessing the phosphorylation state of RAC-PK.

23. The method of Claim 22, wherein the phosphorylation state of RAC-PK at Thr308 and/or Ser473 is assessed.

24. A method of identifying activators or inhibitors of GSK3 comprising exposing the substance to be tested to GSK3 and determining the state of activation of GSK3.

25. A method as claimed in Claim 24, wherein the state of activation of GSK3 is determined by assessing its phosphorylation.

26. A method of determining the suitability of a test substance for use in combatting diabetes, cancer or any disorder which involves irregularity of protein synthesis or glycogen metabolism, the method comprising exposing the substance to be tested to GSK3 and determining the state of activation of GSK3.

27. A method for screening for inhibitors or activators of enzymes that catalyze the phosphorylation of RAC-PK, the method comprising exposing the substance to be tested to one or more enzymes upstream of RAC-PK and nucleoside triphosphate and determining whether (and optionally to what extent) the RAC-PK has been phosphorylated on Thr308 and/or Ser473.

28. A method for screening potential modulators of insulin-mediated intracellular signalling comprising the steps of:

(a) incubating RAC-PK or a fragment thereof with the compound to be screened; and

(b) detecting interaction between the compound and RAC-PK or its fragment.

29. The method according to Claim 28, wherein RAC-PK is activated.

30. Method according to Claim 28, wherein the RAC-PK fragment is selected from the PH domain, the catalytic domain and the *C*-terminal domain.

31. A modulator of insulin-mediated intracellular signalling when identified by a method according to Claim 28.

32. A modulator according to Claim 31, which is selected from the group consisting of IMPDH, GSK-3 and a polypeptide comprising SEQ ID NO: 1.

33. A kit comprising:

(a) RAC, or a fragment thereof;

(b) means for incubating RAC-PK or its fragment with a compound to be screened; and

(c) means for detecting an interaction between RAC-PK or its fragment and the compound.

34. A RAC-PK polypeptide which is activated by effecting one or both of the mutations Thr308 - > D and Ser473- > D.

35. A process for producing an active kinase of a signalling pathway comprising treatment thereof with a phosphatase inhibitor.

36. A process according to Claim 35, which is carried out in vitro and comprises the steps of:

(a) incubating together a kinase of a signalling pathway

(b) an agent capable of phosphorylating the kinase in order to activate it and a phosphatase inhibitor; and

(c) purifying the kinase from the incubation mixture.

37. A process according to Claim 36, wherein the phosphorylating agent is a kinase of the signalling pathway which is capable of phosphorylating the kinase of interest, thereby activating it.

38. A process according to Claim 35, which is performed in cells which contain kinases of the signalling pathway.

39. A process for screening candidate modulators of a signalling pathway comprising:

(a) incubating together a kinase of a signalling pathway and a phosphatase inhibitor;

(b) adding the candidate signalling pathway modulator; and

(c) determining the activity of the kinase.

40. A process according to Claim 39, wherein steps (a) and (b) are performed contemporaneously.

41. A process according to Claim 39, wherein the phosphatase inhibitor is okadaic acid.

42. The process of Claim 39, wherein the phosphatase inhibitor is vanadate.

43. The process of Claim 39, wherein the kinase of the signalling pathway is RAC-PK.

44. The process of Claim 39, wherein the signalling pathway is an insulin-dependent signalling pathway.